Colleges of the Fenway™

Poster Session and Oral Presentations: Titles, Authors, & Abstracts

1. How healthy is our Backyard: A Study on Dissolved Oxygen, Suspended Solids, and Other Vital Levels in the System of the Muddy River. Ainsworth, Gregory; Rosa, Holly; Scola, Samantha. Emmanuel College, Boston. Chemistry Department.

The presented information is the analysis of the water and soil samples of the Muddy River in the Fenway area of Boston, Massachusetts, using the watershed detection limits presented by the EPA. The samples were monitored for typical urban pollutants such as dissolved oxygen, pH, suspended solids and conductivity, nitrates/nitrites, and phosphates among other projects. In the data found, the relative health of the river was analyzed, including how the surrounding environment has affected the life system that is the river. Commercially available test kits were used primarily, and data was replicated to ensure prevention of bias and fault in testing. Dissolved oxygen, especially when influenced by nitrates and organic, suspended solids, will decrease the effectiveness the Muddy River will have in supporting the life associated with it. The research presented here was done in part with Emmanuel College's Service learning course "Chemistry in Boston Waterways."

2. Quantification of Caffeine related to Human Waste in Natural Water. Barnes, Jessica; Zablowsky, Elise. Emmanuel College, Boston. Chemistry Department.

It has been shown that the presence of caffeine in waterways is an indicator of human sewage in the water. Caffeine, 1,3,7-trimethylxanthine, is the world's most common drug and can be found in products such as coffee, tea, soft drinks, cocoa, and chocolate. In addition to these products, caffeine can be found in prescription and over-the-counter medications. Caffeine can only be traced to humans, not animals or fertilizers. The presence of caffeine, therefore, is a direct result of human waste.

The HPLC was used to determine the concentration of caffeine in a sample of water. This technique allows for a quick and efficient analysis of components within a mixture. Samples were taken from the Muddy River and analyzed using this quantification method. The amount of caffeine in the water samples was measured and can be correlated to the degree of human waste present.

3. Baseline Water Quality Study of the Muddy River from September 2006 – April 2007. Berger, Michael; Zou, Ling.

The Master Plan for the Muddy River Restoration Project calls for flood control, improved water quality, enhanced aquatic and riparian habitat, restored landscape and historic resources and the adoption of best management practices to insure that the restoration is properly maintained. In order to better gauge the improvements to the water quality, it is important to establish a baseline of existing conditions. Water samples were collected at the outfalls of eight sites extending along the Muddy River from Jamaica Pond to the Back Bay Fens. This report includes monthly sample analyses from

September 2006 to April 2007 for key parameters: temperature, conductivity, dissolved oxygen, pH, total petroleum hydrocarbons, sulfate, sulfide, chemical oxygen demand, total organic carbon, and iron. Decreases in water quality were noted downstream from Jamaica Pond, and the effects of a petroleum hydrocarbon release were documented. The results of this baseline study are compared to other studies of water quality.

4. Fluorescence Detection of Polycyclic Aromatic Hydrocarbons in Model and Natural Soil Systems. Camire, Eric; Chiu, John.

PAHs are well-known, potentially carcinogenic compounds produced from incomplete combustion processes, including the combustion of fossil fuels. They exhibit harmful effects on both humans and animal health and are an important class of environmental pollutants. Because of their poor solubility in water, PAHs are most commonly found in soil and sediment samples, though particles suspended in the water may contain PAHs. Due to their strong fluorescence both emissions and 2D excitation-emission matrix have been used to identify the presence of PAHs in model and natural soil systems. Sorption isotherms of pyrene with several commercially available humic acids have been acquired to serve as the model soil system. For work with natural soil systems, samples were obtained from the Muddy River in Boston, Massachusetts and analyzed for the presence of typical EPA controlled PAHs.

5. Back Bay Groundwater Monitoring and Declining Water Levels. Cole, Jennifer Rivers; Rosen, Peter.

Hydrogeology is a challenging subject for environmental science students to master, as groundwater must be taught primarily in numerical terms, and a mastery of calculus is necessary for professional or research preparation. Northeastern is an urban university and there is a strong practice-oriented education mission. In the Earth and Environmental programs, access to field sites for course laboratories is a goal, but a challenge. Installing a network of monitoring wells for teaching was not an option. However, there exists a number of groundwater monitoring wells installed as part of the engineering studies for construction and rehabilitation of campus buildings. These wells have been used for water level and water quality monitoring, and are typically capped at the completion of the project.

The Department of Earth and Environmental Sciences (DEES) arranged ongoing permission to access these wells, and to obtain long-term data from the wells through both University Physical Plant office, and the geotechnical engineering firm who installed the wells. Students in hydrogeology thus have the opportunity to learn in an applied sense about water quality issues, construction and excavation issues, historical water table issues in the Back Bay, Boston, MA, and the geological history of the campus and of the Boston region, through the hydrologic data. Monitoring wells are used as labs in the upper-undergraduate Hydrogeology course and for demonstration in introductory environmental geology courses. Since the logistics of getting into the field is resolved, a number of independent student projects have been completed, including: investigating a possible tidal influence on the wells; discovering a water main leak under campus, and documenting structural imperfections in campus buildings and relating them to declining groundwater levels and resultant settling.

Through the Campus Wells Program, we have involved the working community, including University Physical Plant staff and professional geologists in the geotechnical engineering consulting firm, in the education process. We have found that the University staff sees this contact as a rare opportunity to be part of the education program for which they build and maintain the campus, and the consulting geotechnical engineers are similarly eagerly engaged in the learning process. As the monitoring continues through class laboratories, the long-term database of the hydrogeology of campus is growing. Students recognize that their class laboratory exercises involve contributing real data that will have increasing value in the future. The program is an easy, virtually cost-free, practice-oriented teaching device that any university undergoing construction or site cleanup can implement.

6. Distribution of Metals in Muddy River Sediment: A Retrospective of Previous Undergraduate Field Research at Colleges of the Fenway.
Duggan, Jack. Wentworth Institute of Technology, Boston. Environmental Science.

This presentation provides a review of previous undergraduate research performed as collaborative projects between Wentworth Institute of Technology and Simmons College students. To date, research initiatives have focused on the spatial distribution of metals in sediment and the uptake of heavy metals by the plant, *phragmites*. These projects have employed innovative, student developed methods in field sampling, site surveying and sample positioning, sample preparation and metals analysis. The research contributes to a baseline understanding of contaminant levels in the Muddy River and may serve as a resource for future research efforts planned by faculty and students within the Colleges of the Fenway Environmental Science program.

7. Woodlands Restoration Project, Franklin Park, MA. Faszewski, Ellen E., Ph.D., Wheelock College; Poff, Christine, Franklin Park Coalition, Boston.

Franklin Park, the largest park in the Emerald Necklace, designed by Frederick Law Olmsted, has 200 acres of woodlands that are being threatened by invasive plant species. The Franklin Park Coalition (FPC) has begun a Woodlands Restoration Campaign with partners like Wheelock College and efforts to save this ecosystem are underway. Current work includes the creation of a woodlands management plan, public education, and invasive clearing by volunteers-both individual park users and organized groups like Wheelock students. The management plan will provide accurate and detailed field data making it possible to assess current conditions within the woodlands, devise short and long term goals, and direct volunteer work. Various species, including *Polygonum cuspidatum* (Japanese knotweed) and *Frangula alnus* (glossy buckthorn), have already been identified as major threats and are the target of volunteer groups. Involvement of Wheelock College students cutting knotweed in the fall of 2002 demonstrated the potential for large scale clearing of invasives. Building on the successful partnership between FPC and Wheelock, more than 500 volunteers (youth and adults) participate in the woodlands annually. Manual control methods are starting to have a significant impact on plant growth. Repeated cutting of stands of Japanese knotweed over the past two summers have significantly lowered plant height. It is hoped that through this Restoration Campaign, relying heavily on coordinated volunteer efforts, Boston's largest forest will be saved.

8. SENCER and the Colleges of the Fenway Environmental Science Program. Faszewski, Ellen E.; Sellner, Erin. Wheelock College, Boston. Science Department.

With the assistance of the SENCER Program, Colleges of the Fenway (COF) faculty have developed a unique course titled *Environmental Forum*. This course serves as the cornerstone to a joint program in environmental science for the six small private institutions that comprise the COF. More than an introductory course in environmental topics, *Forum* provides a common ground for all environmental science students at all COF institutions to learn about current issues and interact with other COF students and faculty. This course promotes networking opportunities with local, regional, and national environmental agencies. In addition, students perform service learning throughout the Boston community in various areas including environmental advocacy and environmental education. Assessment of the course by COF faculty is currently underway to refine course content and implementation.

9 & 10. Restoring Emerald Necklace Paths at Route 9 and the Landmark Rotary. Furth, Peter G; Collings, Steven L; Gaboury, Nicholas; Haelle, Jeffrey L; Mackey, Silas R; Miller, William J; Ostrowski, Michael J; Simmons, Jonathan M; Tamburrini, John A; Wagoner, Jeffrey J.

Over the years, roads passing across the Muddy River have created barriers and missing sections for the bike paths (formerly bridle paths) along the Muddy River. Two groups of Civil Engineering seniors at Northeastern University studied the feasibility of restoring the integrity of the Muddy River paths while preserving cross-park transportation needs. One group focused on the missing link from Route 9 to Netherlands Road, including a Route 9 crossing; the other, on the Landmark Rotary.

Both groups created designs that prove the feasibility of restoring those missing path segments at relatively little cost while preserving traffic circulation and minimizing environmental impact. A Route 9 footbridge can be relatively inexpensive yet attractive, with ramps made unobtrusive by staying along the Riverway embankment. Paths along both sides of the river are feasible, improving access to the river and enhancing recreational options. Several feasible traffic circulation changes between Route 9 and Netherlands Road were identified that help improve path safety, and restore the paths' integrity, and increase parkland.

At the Landmark Rotary, a riverside path underneath a Riverway bridge will allow the Muddy River paths to reach the interior of the rotary, where the river is soon to be daylighted. New pathway and traffic circulation schemes show that it is possible to provide full connectivity for paths along and across the river and reduce the amount of space dedicated to roads, while at the same time improving the rotary's car-carrying capacity in support of urban development.

11. Investigation into the Physical Adsorption of *E. coli* in Muddy River Water and Particle Matter as it relates to Water Quality and Coliform Levels. Hamel, M.; Balenko, S. ; Ryvkin, F. PhD. Emmanuel College, Boston. Chemistry Department.

Water from urban runoff, from both treated and untreated source, contains constituents that negatively impact the quality of local and coastal waters. The Muddy River and Charles River are closely monitored and tested in order to report on possibly hazardous levels of water contaminants. Many disease causing organisms are found in, and transferred by, animal and human fecal waste. *E. coli* is an important indicator of pathogenic organisms and is tested and compared to the Coliform Index. It has been observed far more *E. coli* are adsorbed to Particle matter than are free floating in a sample of water. Samples of both Particle Matter and Water from the Muddy River were taken over the course of 4 months and analyzed for *E. coli* content using the EasyGel Coliform/*E. coli* testing kit. Preliminary results show that while water samples were within the safety range, the particle matter failed on 3 separate sample dates.

12. Monitoring the Water Quality of the Muddy River. Hellweger, Ferdi L.; Wei, Irvine; Mathew, Miriam; Njoka, Danson. Northeastern University, Boston. Civil & Environmental Engineering.

As part of the Muddy River Restoration Project, we are monitoring the water quality of the Muddy River. The three-year project, which started in September of 2006, monitors water quality at 14 receiving water and outfall locations (Commonwealth Ave, Agassiz Road, Bridge Upstr. of Boston

Gate Houses, Fens Bridge, Longwood Avenue Bridge, Outlet of Leverett Pond, Outlet of Willow Pond, Outlet of Wards Pond, Longwood Avenue Drain, Tannery Brook Drain, Pearl St. Drain, Village Brook Drain, Daisy Field Drain and a roving location). Parameters measured include conventional parameters (Dissolved Oxygen (DO), Specific conductance, Color and Turbidity, Temperature, pH, Odor, Chloride, Alkalinity, Acidity, Biochemical oxygen demand (BOD), Chemical oxygen demand (COD), Total organic carbon (TOC), Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Oil and Grease, Fecal Coliform Bacteria, E. coli, Enterococcus), organics (Total Petroleum Hydrocarbons (TPH), Oil & Grease), metals (Total Zinc, Arsenic, Chromium, Lead, Copper, Cadmium, others) and nutrients (Total Nitrogen, Ammonia Nitrogen, Nitrate & Nitrite Nitrogen, Total Phosphorus, Orthophosphate Phosphorus). Sampling is conducted three times a quarter under (1) dry, (2) wet and (3) after wet precipitation conditions. The presentation includes a description of the historical water quality of the river, the current project and any data that has become available.

13. Muddy River Project: Exploration of Phragmites and their Bioremedial Capabilities. Helou, Ynes; Horan, Shaun. Emmanuel College, Boston Chemistry Department.

By nature, phragmites are an invasive reed species, characteristically adaptable, aggressive and able to reproduce quickly. This invasive species has contributed to the dilapidation of the river, restricting the natural flow of the river and threatening other flora. The nature of this research looks at the potential of *Phragmties australis* in bioremediation of the Muddy River. The study illustrates a different point of view on the role of this reed in the habitat for the architects of the Muddy River Restoration Project who are looking to ameliorate the invasive species. Both experimental and field work was done to observe the correlation between the concentration of the heavy metals in the soil and water versus the amount of Phragmites in the area. Atomic absorption spectroscopy was utilized to measure the heavy metal content. The results indicate that the Phragmites do have some impact on the concentration of heavy metals in the river. It was found that there was a greater concentration of cadmium in the soil where Phragmties did not exist. Thus, the Phragmites do play an important role in keeping heavy metals concentrations down.

14. Bioremediation of Lead by Water Hyacinths. Henderson, Daniel; Nugent, Sean. Emmanuel College, Boston. Chemistry Department.

Bioremediation is a process that can be used to treat water from natural watersheds and urban storm run-off using biological systems rather than chemically based treatments. Plants are currently being used by environmental scientists as a way to remove pollutants, such as toxic heavy metals from water or soil. Our research intent is to investigate the Phytoremediation ability of water hyacinth to remove heavy metals such as lead from natural water. Water hyacinths, *Eichhornia crassipes*, were cultivated in one 14L clear plastic containers filled with artificial pond water. In addition to a control lacking lead, the container was made up to a concentration of 1.6 ppm of lead. The plants were in a growth chamber exposed to both fluorescent and incandescent lighting on a twelve hour light cycle for five days. Plant and water samples were removed from each container every day. The plants were oven dried at 100^{o}C and their roots and leaves analyzed for lead content by flame atomic absorption spectroscopy. The water samples were analyzed in the same fashion. Our results clearly demonstrate that the kinetics of lead uptake is dependent on concentration. Research is in progress to follow up on the kinetics of lead uptake, mass balance and investigate the ability of water hyacinth to remove other metals such as cadmium and arsenic from water supplies.

15. Wildlife Survey of the Muddy River and Wheelock College. Howroyd, Jesse; Carmack, Michelle; Levine, Sara. Wheelock College.

The degradation of the Muddy River has received considerable attention over the last few years with restoration plans currently underway. One method of evaluating the health of this ecosystem is to examine the density and distribution of plant and animal species. The purpose of this specific study was to observe and identify animals along the Muddy River and nearby Wheelock campus. Data were collected throughout the year using a combination of field guides and digital photography. 25 avian species were identified, including domestic waterfowl, woodpeckers, wading birds, and diurnal raptors. In addition, several species of mammals, reptiles, and fish were observed. This study provides us with valuable information regarding the status of the Muddy River and surrounding areas and the extent to which humans have impacted this fragile urban ecosystem.

16. Design Considerations and Challenges of Implementing the Muddy River Flood Control and Environmental Project. Keegan, Mike, P.E.; L.C.S. Project Manager, US Army Corps of Engineers, New England District.

The Muddy River Project's objectives are to increase flood control, improve water quality and improve aquatic/riparian habitat within the Muddy River, and enhance recreational use of adjacent parklands. However, in addition to being within the historic Olmstead Waterway, it is located in the Boston Fenway area which is highly developed with residential, commercial, institutional, utility and traffic concerns that must be met in the project implementation. The Corps of Engineers is currently designing the project so that construction can be initiated in the winter of 2007. This presentation will provide a brief project history as well as outline the design considerations and challenges in implementing this project.

17. Neighborhood as a Lab. Kempe, David; Ainsworth, Gregory; Rosa, Holly.

Our project focuses on the importance of taking the learning experience outside, using not only the classroom, but the entire neighborhood as an appropriate field of study. Our project, being a service learning course, stemmed into two fields of focus, one on a scientific level, and another based on service to the Fenway community. Over the semester, we have conducted many different experiments testing the quality of Muddy River water for various pollutants. This field study worked to provide us with a more worthwhile experience than merely experimenting within the confines of a traditional chemistry course. Throughout these experiments focused on the urban environment, we also gave something back to the surrounding community holding many events that entertained and educated the public on environmental awareness, aiming towards the education of children in the elementary schools close by. Many examples of our efforts, to raise environmental awareness in both our school, and in the Fenway community will be presented.

18. The contribution of clonal growth to the competitive advantage *Phragmites australis* along the Muddy River. Kissam, Ashley; Douhovnikoff, Vladimir. Simmons College, Boston. Biology Department.

In a field based experiment we will test the extent of resource sharing in the clonal plant *Phragmites australis,* a common and invasive reed species along the Muddy River. Clonal growth is a form of asexual reproduction that results when a vegetative body sprouts and produces a potentially independent genetic copy of itself (ramet). One important advantage to clonal growth is an integrated multi-stem genotype that has the potential for

resource sharing between ramets. Theoretically, this allows a plant to forage across a landscape in order to access needed resources and those resources can then be shared throughout the organism. This in turn suggests a potential for division of labor and economies of scale among ramets that may confer significant competitive advantage. Using molecular genetic markers (microsatellites) we will identify the extent of existing clones. Ten large clones will be selected and tested for resource sharing potential using stable isotopes of carbon and nitrogen. Four clones will have stable isotope Carbon 13 introduced to photosynthesizing leaves at a start point. Four clones will have stable isotope Nitrogen 15 introduced to the roots at a start point. The remaining two clones will act as controls and have no additions. Over weekly intervals of growth, leaf samples will be collected at a range of distances along the clone from the start point. These samples will then be sampled for isotope content using a mass spectrometer. Through an analysis of the isotope content at incremental distances from the element introduction point we will determine the rate and extent of resource sharing within clones. Data from this experiment will help explain a potential source of *Phragmites australis'* competitive advantage along the Muddy River.

19. American Black Duck (*Anas rubripes*) and Mallard (*Anas platyrhynchos*) populations on the Muddy River-A Preliminary Study.
Logan, Mark; Wood, Clayton; Hartnett, Liane; Crandall, Douglas. Emmanuel College, Boston.

The Muddy River is a habitat for both American Black Duck (*Anas rubrip*es) (Black ducks) and Mallards (*Anas platyrhynchos*). Both species were observed to over-winter in the vicinity of Longwood T stop. This section of the Muddy River seldom freezes and provides open water that dabbling ducks require. We decided to enumerate both Mallards and Black Ducks over a three week period as a preliminary study for a potential longer term population study. There has also been some evidence that the Black Duck population has been declining in recent years (based on Christmas bird counts done by the National Audubon society) and we wanted to establish some base line numbers for both Black Ducks and Mallards in this one section of the Muddy River. We restricted our counting to a section of the Muddy River from Longwood Ave. to the bridge by the Longwood T stop. We observed 1) numbers of Mallards and Black Ducks 2) numbers of pairs of both. We also counted Canada geese and made note of any other species of waterfowl in the area. During the counting period, the number of Mallards decreased from 20 to 2, and the number of Black Ducks decreased from 56 to 27. The only Mallards observed at the last count were a pair. The Black ducks appeared to be pairing, but many single Black Ducks and groups of unpaired Black Ducks remained. We would like to follow the population numbers of both Black ducks and Mallards through the year as well as compare some other areas of the Muddy River for duck populations.

20. Bird Nesting Patterns in the Muddy River. Nasto, Megan; Houdlette, Michael.

Aside from a host of duck and geese populations, the Muddy River is home to a variety of bird species. There are many unanswered questions related to phragmites growth, water quality, and transportation that may influence the well-being of bird species. The aim of our experiment was to plot the location of bird nests within a sample area of the Muddy River to try to discern what factors lead to healthy environments for the birds. We utilized digital photography for nest identification, as well GPS and satellite maps for nest location. Our area of study focused on the area of the river beginning at the Landmark Center and continuing past the Longwood T-stop. The physical geography of the site (including man-made structures) was also recorded. With the results of this study, we are able to begin to understand the influence of the current status of the Muddy River on the density and distribution of local avian nest sites.

21. Green Roofs for the Muddy River Watershed: A Geospatial Analysis of Potential & Benefits. Pearson, John. University of Massachusetts, Boston.

By increasing vegetative cover in highly urbanized areas, green roofs can improve air quality, save energy, and at the same time provide flood control benefits. Due to these benefits and more, many now consider green roofs as a Best Management Practice (BMP) for improving the health of rivers. Over the course of its lifetime, the Muddy River Restoration Project will implement BMPs in order to improve the health of the river and maintain the investment of the restoration project. Therefore, it is of primary importance that all BMPs have their benefits quantified in order to help determine their feasibility. This research utilized GIS analysis to determine the flood control, energy savings and air quality benefits of constructing green roofs within the Muddy River watershed, a highly urbanized tributary basin of the Charles River in Massachusetts. The data showed that green roofs provide substantial flood control, air quality, and energy saving benefits. This research can serve as the baseline of future research and policy incentives for green roofs in Boston and Brookline.

22. Changing Environmental Conditions Recorded in Back Bay Sediments, Boston, MA. Rosen, Peter S; Cole, Jennifer Rivers. Northeastern University, Boston. Department of Earth and Environmental Sciences.

Building excavations through the landfill and underlying sediments in Back Bay, near the historic mouth of the Muddy River, permitted observation of a five meter thick Holocene estuarine sediment sequence. The environmental changes reflected in these sediments include a decreasing rate of sea level rise and an increasing energy level. Increasing tidal energy corresponds to the increase in tide range as rising sea levels filled the Gulf of Maine to create a water body in resonance with the tidal period, resulting in the present amplification of the tides. The decreasing rate of sea level rise is well documented in sea level curves based on salt marsh stratigraphy.

The estuarine sequence uncomfortably overlies a weathered surface of Blue Clay, a glacio-marine meltwater deposit approximately 14,000 years old. The lower unit (5,630 to 3570 years BP) defines the first encroachment of rising sea level into Back Bay with a sequence grading from intertidal saltmarsh to subtidal laminated muds (deepening water). The middle estuarine unit (3,570 to 3,090 yrs BP) is interpreted as channel deposits based on well-preserved lag deposits. The upper unit is shallow subtidal sandy muds with interfingered tidalites. The upper portions of this unit are tidal flats and salt marshes that correspond to historical records, and show a shallowing of the water.

23. Detection of petroleum products in water samples of Muddy River. ter Meer, Laura; Allakhverdiyeva, Yuliya. Emmanuel College, Boston. Chemistry Department.

High concentrations of Extractable Petroleum Hydrocarbons (EPH), aromatics (BETX), and Volatile Petroleum Hydrocarbons (VPH) can lead to various damages on both the environment and human health. Petroleum products spread on water surfaces and are quickly absorbed by porous soils, these damages directly impact wildlife and their habitats (such as coating birds or mammals with a layer of oil). They have harmful effects on the skin, body fluids and immune system. The damages done by such hydrocarbons on human health have harmful effects Petroleum products are also known to cause reproductive problems. These hydrocarbons are the main components of gasoline, oil and grease. The purpose of this experiment is to detect the contamination of petroleum in water samples of Muddy River. The standards, water and soil samples were analyzed using IR spectroscopy technique. The possible presence of petroleum products in Muddy River water samples will be discussed.

24. Urban Tree Identification in Charlesgate. Ward, Margo; Pittenger, Haley; Yopak, Regina. Colleges of the Fenway Environmental Science Program.

Urban environments are constantly faced with threats of pollution, habitat destruction, and over-population. To evaluate the extent of human influences on these ecosystems, it is important to examine the diversity and quality of species found within these areas. The purpose of this study was to inventory tree species located in the Charlesgate area along the Muddy River. A GPS tracker was utilized to collect data including trunk and crown diameter at breast height, tree height, condition of the tree, and species identification. Preliminary data have indicated that the predominant species include red and hedge maple as well as pin oak with the majority of trees being in fair condition. The results from this project can then be combined with previous studies conducted along the Muddy River to aid in its restoration.

25. Analysis of Volatile Components of Muddy River Sediment Using Gas Chromatography/Mass Spectrometry. Zou, Ling, Simmons College, Boston; Duggan, Jack, Wentworth Institute of Technology, Boston; Berger, Michael, Simmons College, Boston.

Boston's famed Emerald Necklace is threatened by years of contaminated sediment deposition. Brookline, Boston, the Commonwealth of Massachusetts and the Federal Government are committed to restoring the river to good health, and dredging the sediment is one of the key steps. A healthy Muddy River will mitigate potential flooding and also restore this historic landscape to Olmsted's vision.

Currently the Army Corps of Engineers has considered filter press treatment of the sediment before disposal as hazardous waste. There is the potential for the release of odorous and noxious gases during the dredging process. By understanding the sulfur chemistry of the sediment it is possible to model the potential volatilization of hazardous sulfur compounds during the dredging process. The purpose of this study is to identify volatile sulfur compounds as well as other volatile organic compounds present in the Muddy River sediment.

Sediment samples were collected in March 2007 and kept at room temperature in a sealed container. Nitrogen was passed through a slurry of the sediment at room temperature and then through collection flasks containing either hexane or methanol. The solutions were then analyzed using a Perkin Elmer Claris 500 GC/MS.